FITCHBURG GAS AND ELECTRIC LIGHT COMPANY
ELECTRIC DIVISION RATE REQUEST

DIRECT TESTIMONY

OF

SAMUEL C. HADAWAY

Massachusetts Department of Telecommunications and Energy
D.T.E. 02-___

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I. INTRODUCTION AND QUALIFICATIONS

Q. Please state your name, occupation, and business address.

A. My name is Samuel C. Hadaway. I am a Principal in FINANCO, Inc., Financial Analysis Consultants, 3520 Executive Center Drive, Austin, Texas 78731.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of Fitchburg Gas & Electric Light Company (hereinafter FG&E or the Company).

Q. Please state your educational background and describe your professional training and experience.

A. I have an economics degree from Southern Methodist University and MBA and Ph.D. degrees in finance from the University of Texas at Austin (UT Austin). I serve as an adjunct professor in the Graduate School of Business at UT Austin. I have taught economics and finance courses, and I have conducted research and directed graduate students writing in these areas. I was previously Director of the Economic Research Division at the Public Utility Commission of Texas, where I supervised the Commission's finance, economics, and accounting staff and served as the Commission's chief financial witness in electric and telephone rate cases. I have taught courses in various utility conferences on cost of capital, capital structure, utility financial condition, and cost allocation and rate design issues. I have made presentations before the New York Society of Security Analysts, the National Rate of

Return Analysts Forum, and various other professional and legislative groups. I have served as a vice president and on the board of directors of the Financial Management Association.

A list of my publications and testimony I have given before various regulatory bodies and in state and federal courts is contained in my resume, which is included as Appendix A.

II. PURPOSE AND SUMMARY OF TESTIMONY

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to estimate FG&E's market required rate of return on equity (ROE) for the electric division.

Q. Please outline and describe the testimony you will present.

A. My testimony is divided into six sections. In Section III, I review various methods for estimating the cost of equity. In this section, I discuss comparable earnings methods, risk premium methods, and discounted cash flow (DCF) methods. In Section IV, I review general capital market costs and conditions and discuss recent developments in the electric utility industry that may affect the cost of capital. In Section V, I discuss the details of my cost of equity studies and summarize my ROE recommendations. In Section VI, I provide a brief summary table from my analyses and a statement of my conclusions.

Q. Please summarize your cost of equity studies and state your ROE recommendation.

A. My ROE recommendation is based on a combination of the DCF and risk premium models. I apply the DCF model to all triple-B or higher rated electric utilities followed by *Value Line*

for which domestic utility revenues are at least 70% of total revenues and for which complete and reliable data are available. Also to avoid anomalous effects on the DCF analysis that might result from the California energy crisis, I excluded companies reported in *Value Line's* West Edition. In addition, I provide two risk premium analyses: one based on *Moody's* utility interest rate data and one based on *Standard & Poor's (S&P)* electric utility interest rate data. Under current market and electric utility industry conditions, I believe a combination approach, based on the DCF and risk premium models, is the most reliable method for estimating the Company's cost of equity capital. The data sources and the details of my rate of return analysis are contained in Schedules SCH-1 through SCH-6.

My DCF analysis indicates that an ROE range of 10.5%-12.6% is appropriate. My risk premium analyses indicate that an ROE of 12.0% is appropriate. Based on these quantitative results and my review of the current market, industry, and company-specific factors discussed in the remainder of my testimony, I estimate the fair cost of equity for FG&E at 11.5%.

III. ESTIMATING THE COST OF EQUITY CAPITAL

Q. What is the purpose of this section of your testimony?

A. The purpose of this section is to present a general definition of the cost of equity and to compare the strengths and weaknesses of several of the most widely used methods for estimating the cost of equity. Estimating the cost of equity is fundamentally a matter of

informed judgment. The various models provide a concrete link to actual capital market data and assist with defining the various relationships that underlie the ROE estimation process.

Q. Please define the term "cost of equity capital" and provide an overview of the cost estimation process.

A. The cost of equity capital is the profit or rate of return that equity investors expect to receive. In concept it is no different than the cost of debt or the cost of preferred stock. The cost of equity is the rate of return that common stockholders expect, just as interest on bonds and dividends on preferred stock are the returns that investors in those securities expect. Equity investors expect a return on their capital commensurate with the risks they take and consistent with returns that might be available from other similar investments. Unlike returns from debt and preferred stocks, however, the equity return is not directly observable in advance and, therefore, it must be estimated or inferred from capital market data and trading activity.

An example helps to illustrate the cost of equity concept. Assume that an investor buys a share of common stock for $20 per share. If the stock's expected dividend is $1.25, the expected dividend yield is 6.25% ($1.25 / $20 = 6.25%). If the stock price is also expected to increase to $21.25 after one year, this one $1.25 expected gain adds an additional 6.25% to the expected total rate of return ($1.25 / $20 = 6.25%). Therefore, buying the stock at $20 per share, the investor expects a total return of 11.5%: 6.25%

dividend yield, plus 6.25% price appreciation. In this example, the total expected rate of return at 11.5% is the appropriate measure of the cost of equity capital, because it is this rate of return that caused the investor to commit the $20 of equity capital in the first place. If the stock were riskier, or if expected returns from other investments were higher, investors would have required a higher rate of return from the stock, which would have resulted in a lower initial purchase price in market trading.

Each day market rates of return and prices change to reflect new investor expectations and requirements. For example, when interest rates on bonds and savings accounts rise, utility stock prices usually fall. This is true, at least in part, because higher interest rates on these alternative investments make utility stocks relatively less attractive, which causes utility stock prices to decline in market trading. This competitive market adjustment process is quick and continuous, so that market prices generally reflect investor expectations and the relative attractiveness of one investment versus another. In this context, to estimate the cost of equity one must apply informed judgment about the relative risk of the company in question and knowledge about the risk and expected rate of return characteristics of other available investments as well.

Q. How does the market account for risk differences among the various investments?

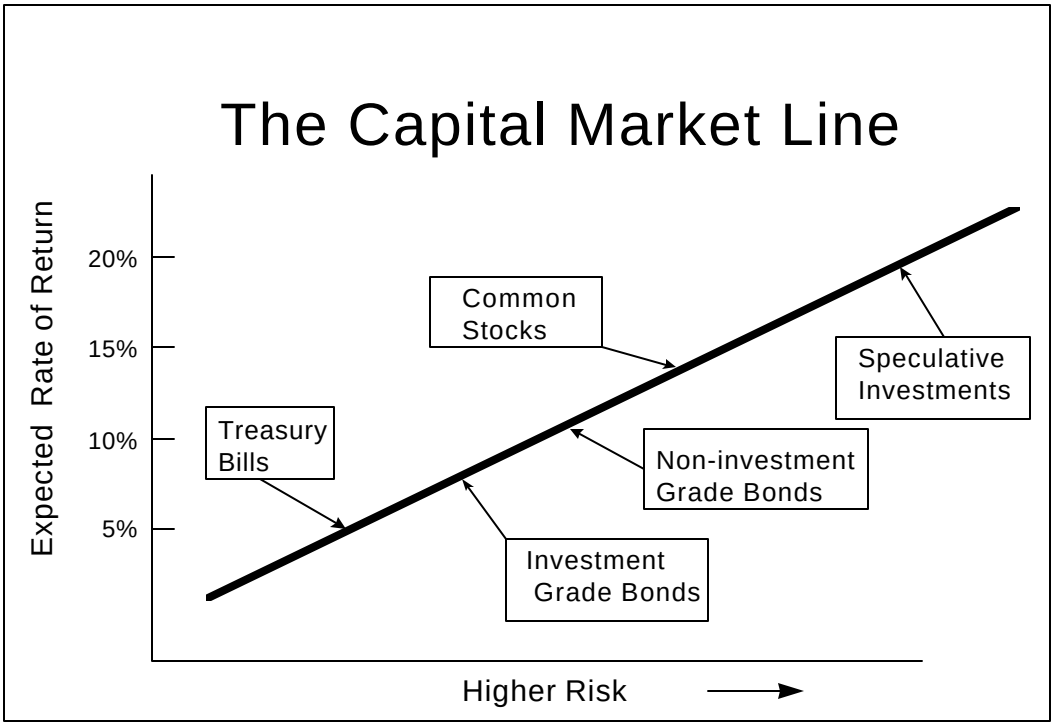
A. Risk-return tradeoffs among capital market investments have been the subject of extensive financial research. Literally dozens of textbooks and hundreds of academic articles have

addressed the issue. Generally, such research confirms the common sense conclusion that investors will take additional risks only if they expect to receive a higher rate of return. Empirical tests consistently show that returns from low risk securities, such as U.S. Treasury bills, are the lowest; that returns from longer-term Treasury bonds and corporate bonds are increasingly higher as risks increase; and generally, returns from common stocks and other more risky investments are even higher. These observations provide a sound theoretical foundation for both the DCF and risk premium methods for estimating the cost of equity capital. These methods attempt to capture the well-founded risk-return principle and explicitly measure investors' rate of return requirements.

Q. Can you illustrate the capital market risk-return principle that you just described?

A. Yes. The following graph depicts the risk-return relationship that has become widely known as the Capital Market Line (CML). The CML offers a graphical representation of the capital market risk-return principle. The graph is not meant to illustrate the actual expected rate of return for any particular investment, but merely to illustrate in a general way the risk-return relationship.

Risk-Return Tradeoffs



As a continuum, the CML can be viewed as an available opportunity set for investors. Those investors with low risk tolerance or investment objectives that mandate a low risk profile should invest in assets depicted in the lower left-hand portion of the graph. Investments in this area, such as Treasury bills and short-maturity, high quality corporate commercial paper, offer a high degree of investor certainty. In nominal terms (before considering the potential effects of inflation), such assets are virtually risk-free.

Investment risks increase as one moves up and to the right along the CML. A higher degree of uncertainty exists about the level of investment value at any point in time and about the level of income payments that may be received. Among these investments, long-term bonds and preferred stocks, which offer priority claims to assets and income payments, are relatively low risk, but they are not risk-free. The market value of long-term bonds, even those issued by the U.S. Treasury, often fluctuates widely when government policies or other factors cause interest rates to change.

Farther up the CML continuum, common stocks are exposed to even more risk, depending on the nature of the underlying business and the financial strength of the issuing corporation. Common stock risks include market-wide factors, such as general changes in capital costs, as well as industry and company specific elements that may add further to the volatility of a given company's performance. As I will illustrate in my risk premium analysis, common stocks typically are more volatile (have higher risk) than high quality bond investments and, therefore, they reside above and to the right of bonds on the CML graph. Other more speculative investments, such as stock options and commodity futures contracts, offer even higher risks (and higher potential returns). The CML's depiction of the risk-return tradeoffs available in the capital markets provides a useful perspective for estimating investors' required rates of return.

Q. How is the fair rate of return in the regulatory process related to the estimated cost of equity capital?

A. The regulatory process is guided by fair rate of return principles established in the U.S. Supreme Court cases, *Bluefield Waterworks* and *Hope Natural Gas*:

> A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties; but it has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures. *Bluefield Waterworks & Improvement Company v. Public Service Commission of West Virginia*, 262 U.S. 679, 692-693 (1923).

> From the investor or company point of view, it is important that there be enough revenue not only for operating expenses, but also for the capital costs of the business. These include service on the debt and dividends on the stock. By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital. *Federal Power Commission v. Hope Natural Gas Co*., 320 U.S. 591, 603 (1944).

Based on these principles, the fair rate of return should closely parallel investor opportunity costs as discussed above. If a utility earns its market cost of equity, neither its stockholders nor its customers should be disadvantaged.

Q. What specific methods and capital market data are used to evaluate the cost of equity?

A. Techniques for estimating the cost of equity normally fall into three groups: comparable earnings methods, risk premium methods, and DCF methods. The first set of estimation

techniques, the comparable earnings methods, has evolved over time. The original comparable earnings methods were based on book accounting returns. This approach developed ROE estimates by reviewing accounting returns for unregulated companies thought to have risks similar to those of the regulated company in question. These methods have generally been rejected because they assume that the unregulated group is earning its actual cost of capital, and that its equity book value is the same as its market value. In most situations these assumptions are not valid, and, therefore, accounting-based methods do not generally provide reliable cost of equity estimates.

More recent comparable earnings methods are based on historical stock market returns rather than book accounting returns. While this approach has some merit, it too has been criticized because there can be no assurance that historical returns actually reflect current or future market requirements. Also, in practical application, earned market returns tend to fluctuate widely from year to year. For these reasons, a current cost of equity estimate (based on the DCF model or a risk premium analysis) is usually required.

The second set of estimation techniques is grouped under the heading of risk premium methods. These methods begin with currently observable market returns, such as yields on government or corporate bonds, and add an increment to account for the additional equity risk. The capital asset pricing model (CAPM) and arbitrage pricing theory (APT) model are more sophisticated risk premium approaches. The CAPM and APT methods

estimate the cost of equity directly by combining the "risk-free" government bond rate with explicit risk measures to determine the risk premium required by the market. Although these methods are widely used in academic cost of capital research, their additional data requirements and their potentially questionable underlying assumptions have detracted from their use in most regulatory jurisdictions. Also, recent anomalies in the U.S. Treasury securities, which are used as a proxy for the CAPM “risk-free rate” have raised further questions about that model’s current applicability. The simple risk premium approach provides a useful parallel approach to the DCF model, and it assures consistency with other capital market data in estimates of the cost of equity.

The third set of estimation techniques, based on the DCF model, is the most widely used approach in regulatory proceedings. Like the risk premium method, the DCF model has a sound basis in theory, and many argue that it has the additional advantage of simplicity. I will describe the DCF model in detail below, but in essence its estimate of ROE is simply the sum of the expected dividend yield and the expected long-term dividend (or price) growth rate. While dividend yields are readily available, long-term growth estimates are more difficult to obtain. Because the constant growth DCF model requires very long-term growth estimates (technically to infinity), some argue that its application is subjective and that more explicit multistage growth DCF models are preferred. In the final analysis, ROE estimates are subjective and should be based on sound, informed judgment. To accomplish

this task, I apply several versions of the DCF and risk premium models, which results in an ROE range that I believe brackets the fair cost of equity capital.

Q. Please explain the DCF model.

A. The DCF model is predicated on the concept, or in fact the definition, that a stock's price represents the present value of all investor expected cash inflows from the stock. In the most general form, the model is expressed in the following formula:

$$P_0 = D_1/(1+k) + D_2/(1+k)^2 + ... + D_\infty/(1+k)^\infty \qquad (1)$$

where P_0 is today's stock price; D_1, D_2, etc. are all expected future dividends and k is the discount rate, or the investor's required rate of return on equity. Equation (1) is a routine present value calculation with the difficult data requirement of estimating all future dividends.[1]

Under the additional assumption that dividends are expected to grow at a constant rate "g," equation (1) can be solved for k and rearranged into the simple form:

$$k = D_1/P_0 + g \qquad (2)$$

Equation (2) is the familiar constant growth DCF model for cost of equity estimation, where D_1/P_0 is the expected dividend yield and g is the long-term expected dividend growth rate.

Under circumstances when growth rates are expected to fluctuate or when future growth rates are highly uncertain, the constant growth model may be questionable, and

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[1] As a practical matter, the present value of dividends expected in the very distant future is typically insignificant, and operationally the DCF model can be reasonably estimated by discounting a finite

explicit changing growth estimates may be required. Although the DCF model itself is still valid [equation (1) is mathematically correct], under the assumption of fluctuating growth the simplified form of the model must be modified to capture market expectations accurately.

Recent events and current market conditions in the electric utility industry, as discussed in Section IV, appear to challenge the constant growth assumption of the traditional DCF model. Since the mid-1980s, dividend growth expectations for many electric utilities have fluctuated widely. In fact, almost half of the electric utilities in the U.S. have reduced or eliminated their common dividends during the past several years. Some of these companies have reestablished their dividends, producing exceptionally high growth rates. Under these circumstances, long-term growth rate estimates may be highly uncertain, and estimating a reliable "constant" growth rate for many companies is often difficult.

Q. How is the DCF model applied when the growth rates fluctuate?

A. When growth are expected to fluctuate, the more general version of the model represented in equation (1) should be solved explicitly over a finite "transition" period while uncertainty prevails. The constant growth version of the model can then be applied after the transition period, under the assumption that more stable conditions will prevail in the future. There are two alternatives for dealing with the nonconstant growth transition period.

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dividend stream, or with the assumption that the stock will be sold for some estimated price in the foreseeable future.

Under the "Market Price" version of the DCF model, equation (1) is written in a slightly different form:

$$P_0 = D_1/(1+k) + D_2/(1+k)^2 + ... + P_T/(1+k)^T \quad (3)$$

where the variables are the same as in equation (1) except that P_T is the estimated Market Price at the end of the transition period T. Under the assumption that constant growth resumes after the transition period, the price P_T is then expected to be based on constant growth assumptions. As with the general form of the DCF model in equation (1), in the Market Price approach the current stock price (P_0) is the present value of expected cash inflows, but the cash flows are comprised of dividends and an ultimate selling price for the stock. The estimated cost of equity, k, is just the rate of return that investors would expect if they bought the stock at today's price, held it and received dividends through the transition period (until period T), and then sold it for price P_T.

Under the "Multistage" growth DCF approach, equation (1) is expanded to incorporate two or more growth rate periods, with the assumption that a permanent constant growth rate can be estimated for some point in the future:

$$P_0 = D_0(1+g_1)/(1+k) + ... + D_0(1+g_2)^n/(1+k)^n + ... + D_0(1+g_T)^{(T+1)}/(k-g_T) \quad (4)$$

where the variables are the same as in equation (1), but g_1 represents the growth rate for the first period, g_2 for a second period, and g_T for the period from year T (the end of the transition period) to infinity. The first two growth rates are estimates of fluctuating growth

over "n" years (typically 5 or 10 years) and g_T is a constant growth rate assumed to prevail forever after year T.

Although less convenient for exposition purposes, the nonconstant growth models are based on the same valid capital market assumptions as the constant growth version. The nonconstant growth approach simply requires more explicit data inputs and more work to solve for the discount rate, k. Fortunately, the required data are generally available from investment and economic forecasting services, and computer algorithms can easily produce the required solutions. Both constant and nonconstant growth DCF analyses are presented in the following section.

Q. Please explain the risk premium methodology.

A. Risk premium methods are based on the assumption that equity securities are riskier than debt and, therefore, that equity investors require a higher rate of return. This basic premise is well supported by legal and economic distinctions between debt and equity securities, and it is widely accepted as a fundamental capital market principle. For example, debt holders' claims to the earnings and assets have priority over all claims of equity investors. The contractual interest on mortgage debt generally must be paid in full before any dividends can be paid to shareholders, and secured mortgage claims must be fully satisfied before any assets can be distributed to shareholders in bankruptcy. Also, the guaranteed, fixed-income nature of interest payments on debt makes year-to-year returns from bonds typically more

stable than capital gains and dividend payments on stocks. All these factors support the proposition that stockholders are exposed to more risk and that shareholders should reasonably expect a positive equity risk premium.

Q. Are risk premium estimates of the cost of equity consistent with other current capital market costs?

A. Yes. The risk premium approach is especially useful because it is founded on current market interest rates, which are directly observable. This feature assures that risk premium estimates of the cost of equity begin with a sound basis, which is tied directly to current capital market costs.

Q. Is there similar consensus about how risk premium data should be employed?

A. No. In regulatory practice, there is often considerable debate about how risk premium data should be interpreted and used. Since the analyst's basic task is to gauge investors' required returns on long-term investments, some argue that the estimated equity spread should be based on the longest possible time period. Others argue that market relationships between debt and equity from several decades ago are irrelevant and that recent debt-equity observations should be given more weight in estimating investor requirements. There is no consensus on this issue. Since analysts cannot observe or measure investors' actual expectations, it is not possible to know exactly how such expectations are formed or, therefore, exactly what time period is most appropriate in a risk premium analysis.

The important question to answer is the following: "What rate of return should equity investors reasonably expect relative to returns currently available from long-term bonds?" The risk premium studies and analyses I discuss in Section V address this question. My risk premium recommendation is based on an intermediate position that avoids some of the problems and concerns that have been expressed about both very long and very short periods of analysis with the risk premium model.

Q. Please summarize your discussion of cost of equity estimation techniques.

A. Estimating the cost of equity is a controversial issue in utility ratemaking. Because actual investor requirements are not directly observable, analysts have developed several methods to assist in the process. The comparable earnings method is the oldest but perhaps least reliable. Its use of accounting rates of return, or even historical market returns, may or may not reflect current investor requirements. Differences in accounting methods among companies and issues of comparability also detract from this approach.

The DCF and market-based risk premium methods are more widely accepted in regulatory practice. I believe that a combination of the DCF model and a review of risk premium data provides the most reliable approach. While the DCF model requires judgment about future growth rates, the dividend yield portion of the model is straightforward, and the model's results are generally consistent with actual capital market behavior. For these

reasons, I will rely on a combination of the DCF model and a risk premium analysis in the cost of equity studies that follow in Section VI of this testimony.

IV. FUNDAMENTAL FACTORS THAT AFFECT THE COST OF EQUITY CAPITAL

Q. What is the purpose of this section of your testimony?

A. The purpose of this section is to review recent capital market costs and conditions as well as industry- and Company-specific factors that should be reflected in the cost of equity capital in this case.

Q. What has been the recent experience in the U.S. capital markets?

A. Schedule SCH-2 provides a review of annual interest rates and rates of inflation that have prevailed in the U.S. economy over the past ten years. During that period, inflation and capital market costs have been relatively stable and lower than prevailed in the previous decade. Inflation, as measured by the Consumer Price Index, fell to below 2% in 1998, a level not seen consistently since the 1960s. Although rising energy prices and rapid economic growth increased inflation and interest rates during 1999 and 2000, in 2001, the economic slowdown constrained inflationary effects and provided a stable interest rate environment. Most estimates for 2002 are for improved economic growth, with continued price stability and moderately higher interest rates.

In addition to relatively stable economic data, debt policies of the U.S. Treasury have altered some historical capital market relationships. Treasury operations have focused

on short-term liquidity, overall debt reduction, and generally shorter Treasury debt maturities. Also, outside the U.S., increasing uncertainty and, at times, extreme capital market volatility have contributed further to changing cost of capital relationships. The 1998 "flight to safety" following the Asian financial crisis caused literally billions of dollars to flow out of more risky investments and into U.S. Treasury bonds. More recently, unusual supply and demand conditions for U.S. Treasury bonds have caused other market anomalies, with the government rate declining much more rapidly than rates on other securities.

These relationships are borne out in market data. For example, prior to the events of 1998, for the 15 years ended in 1997, rates on single-A industrial bonds averaged 116 basis points (1.16%) above long-term Treasury bonds.[2] By October 1998, in the midst of the Asian, Russian, and other international monetary difficulties, the U.S. industrial single-A spread widened to 172 basis points and the single-A public utility spread was even wider at 195 basis points. Through February 2002, Moody's single-A utility yield spreads have remained large, with the recent spread at 220 basis points. This relationship reflects on-going concerns about increasing capital market risks and vividly illustrates the increasing corporate cost of capital relative to U.S. Treasury bond interest rates.

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[2] Moody's Investors Service, "High Leveraging's Last Stand," September 28, 1998.

Schedule SCH-3 provides a summary of Moody's and Average Utility Bond Yields (page 1) and S&P's Electric Utility Bond Yields. For the most recent three months, Moody's Baa (triple-B) Utility Rate was 8.22%, and S&P's BBB Electric Utility Rate was 8.32%.

Q. How have utility stocks performed during the past two years?

A. Stock prices for many utility companies have fluctuated widely during the past two years. Prices rose significantly during most of 2000, but dropped precipitously in January 2001 as Western energy concerns mounted. Since then, utility prices have remained volatile, with the recent (April 11, 2002) Dow Jones Utility Average, at 302.41 is about 27% below the record weekly close of 412.16 reached in December 2000.

Q. What is the current fundamental position of the electric utility industry?

A. Utility investors obviously have been shaken by the defaults of the two largest California electric utilities, and the concomitant cascading effects on other Western utilities, as well as by the collapse of Enron. Although caused by different circumstances and events, the Western energy crisis and Enron's failure both stem from fundamental structural changes in the electric power industry.

With passage of the National Energy Policy Act (NEPA) in 1992 and the Federal Energy Regulatory Commission's (FERC) Order 888 in 1996, the stage was set for vastly increased competition in the electric utility industry. NEPA's mandate for open access to the

transmission grid and FERC's implementation through Order 888 effectively opened the market for wholesale electricity to competition. Previously protected utility service territory and lack of transmission access in some parts of the country had limited the availability of competitive bulk power prices. NEPA and Order 888 have essentially eliminated such constraints for incremental power needs.

In addition to wholesale issues at the federal level, many states, such as Massachusetts, have opened retail markets to full competition. Prior to the Western energy crisis, investors' concerns had focused principally on appropriate transition mechanisms and the recovery of stranded costs. More recently, however, provisions for dealing with power cost adjustments have become a larger concern. The Western energy crisis has refocused market concerns and contributed significantly to increased market risk perceptions for the industry. As expected, the opening of previously protected utility markets to competition, and the uncertainty created by the removal of regulatory protection, has raised the level of uncertainty about investment returns across the entire industry.

Q. Is FG&E affected by these same market uncertainties and increasing utility capital costs?

A. Yes. to some extent all electric utilities are being affected by the industry's transition to competition. Based on FG&E's restructuring plan in Massachusetts, which was approved by the Commission January 15, 1999, customers have the ability to choose an energy supplier or an option to purchase Standard Offer Service provided by FG&E at regulated

prices. Customers continue to receive a cumulative inflation adjusted rate reduction of 15%. In effect, FG&E remains the provider of last resort and bears the potential middleman risks of nonpayment or failure of energy service providers.

The transition to competition has faced many obstacles. In Massachusetts, the retail market has been very slow to develop. The many regulatory responses to ensuring the market becomes sufficiently competitive also creates risks for transitioning companies. While the Department has approved FG&E's recovery of stranded assets, over the next decade, to the extent that there are unexpected changes in political, regulatory and/or business environments, FG&E's recovery of these stranded assets may be affected. This prospect, prior to full recovery, creates a business risk and uncertainty.

In addition, there are two on-going proceedings that pertain to competition, D.T.E. 01-28 (Phase I)-Advanced Metering Services and D.T.E. 01-28 (Phase II)-Billing Services. These proceedings demonstrate that other assets of the Company required to serve customers, may become subject to increasing competition (and risk) because of regulatory or legislative initiatives regarding these traditional utility services.

Last, although FG&E has a defined service territory, FG&E faces by-pass competition from self-generation and distributed generation that may reduce the use, and thus the value, of its distribution system.

Q. How do capital market concerns about competition affect the cost of equity capital?

A. As I discussed previously in Section III, equity investors respond to changing assessments of risk and financial prospects by changing the price they are willing to pay for a given security. When the risk perceptions increase or financial prospects decline, investors refuse to pay the previously existing market price for a company's securities and market supply and demand forces then establish a new lower price. The lower market price typically translates into a higher cost of capital through a higher dividend yield requirement as well as the potential for increased capital gains if prospects improve. In addition to market losses for prior shareholders, the higher cost of capital is transmitted directly to the company by the need to issue more shares to raise any given amount of capital for future investment. The additional shares also impose additional future dividend requirements and reduce future earnings per share growth prospects.

Q. How have regulatory commissions responded to these changing market and industry conditions?

A. On balance, allowed rates of return have changed very little over the past five years. The following table summarizes the electric utility ROEs allowed by state regulatory commissions since 1997.

Electric Authorized Equity Returns

	1997	1998	1999	2000	2001
1st Quarter	11.30%	11.31%	10.58%	11.06%	11.38%
2nd Quarter	11.62%	12.20%	10.94%	11.11%	10.88%
3rd Quarter	12.00%	11.80%	10.63%	11.68%	10.78%
4th Quarter	11.11%	11.83%	11.08%	12.08%	11.57%
Full Year	11.40%	11.66%	10.77%	11.43%	11.06%
Average Utility Debt Cost	7.63%	7.00%	7.55%	8.14%	7.72%
Indicated Risk Premium	3.77%	4.66%	3.22%	3.29%	3.34%

Source: *Regulatory Focus*, Regulatory Research Associates, Inc., Major Rate Case Decisions, April 2002.

Although long-term interest rates in 1998 and early 1999 declined to their lowest levels since 1968, allowed equity returns declined by a smaller amount and remained near 11 percent. Utility interest rates generally rose through 1999 and into 2000, with Moody's Average Utility Rate for 2000 above 8.0 percent. During 2001, utility interest rates fluctuated slightly lower, with the average annual rate at 7.72 percent. Also, for the three months ended March 2002, the Average Utility Rate was 7.72 percent. At the low end of the risk premium range shown above, the indicated cost of equity based on recent utility debt costs equals about 11 percent (7.72% + 3.22% = 10.94%). At the high end of the risk premium range, based on the 1998 period, the indicated ROE is 12.4 percent (7.72% + 4.66% =12.38%).

V. COST OF EQUITY CAPITAL FOR FG&E

Q. What is the purpose of this section of your testimony?

A. The purpose of this section is to present my quantitative studies of the cost of equity capital for the Company and to discuss the details and results of my analyses.

Q. How are your studies organized?

A. In the first part of my cost of equity analysis, I apply the DCF model to a group of triple-B and higher rated electric utility companies. (Unitil's implied bond rating is triple-B.) The group was selected to include all such electric utilities covered in *Value Line* for which complete and reliable data are available and for which at least 70% of revenues are derived from domestic utility operations. As noted previously, to avoid anomalous Western energy effects on the DCF analysis, I have also excluded companies reported in *Value Line's* West Edition. The results of my DCF analyses are summarized in Schedule SCH-4, page 1 of 5. The DCF models indicate a range of 10.5%-12.6%. In the second part of my analysis, I discuss and develop cost of equity estimates based on the risk premium approach. I present my risk premium studies in Schedules SCH-5 and SCH-6. Those analyses, which are based on allowed regulatory ROEs relative to contemporaneous utility debt costs for the period, indicate a cost of equity of 12.0%. Given current market and utility industry conditions, I believe the risk premium approach adds important perspective for judging current investor

requirements. Based on the results of my DCF and risk premium studies and my review of current market and industry conditions, I estimate FG&E's cost of equity at 11.5%.

A. Discounted Cash Flow Analysis

Q. What stock prices are used in your DCF analyses?

A. Throughout my analysis I have used average stock prices from the most recent three months for each company (January-March 2002). Although technically either average or spot stock prices can be used in a DCF analysis, a reasonably current price consistent with present market conditions and the other data employed in the analysis is most appropriate. Since the cost of equity is a current and forward-looking concept, the important issue is that the price should be representative of current market conditions and not unduly influenced by unusual or special circumstances.

To ensure that my DCF analyses are not skewed by unrepresentative initial stock prices, I calculate, in Schedule SCH-3, the average of high and low prices for each of the three months ending March 2002 for each company in my comparable group. I then compare the three-month average price for each company to *Value Line's* single-month prices. As shown in column 6 of Schedule SCH-3, the three-month average price used in my analysis is $0.23 per company different from *Value Line's* single-month prices. This comparison shows that either three-month average stock prices or *Value Line's* single month prices can be used in the DCF analysis without any material impact on the results.

Q. Please summarize the results of your comparable company DCF analyses.

A. The results from my comparable company DCF analyses are presented in Schedule SCH-4, page 1. The constant growth DCF model indicates that an ROE range of 10.8%-11.1% is appropriate. The nonconstant growth Market Price DCF Model indicates that an ROE range of 12.4%-12.6% is appropriate. The Two-Stage Growth DCF model indicates that an ROE range of 10.5%-10.6% is appropriate. Overall, my DCF analyses indicate that a range of 10.5%-12.6% is appropriate

B. Risk Premium Analysis

Q. What are the results of your risk premium studies?

A. The results of my risk premium studies are shown in Schedules SCH-5 and SCH-6. My analysis compares average ROEs allowed each year by the various state regulatory commissions to contemporaneous utility debt costs. Both of my risk premium studies indicate that an ROE of 12.0% is appropriate.

Q. How are your risk premium studies structured?

A. I provide two primary risk premium studies, and I compare my results to other published risk premium estimates. In my primary studies, I compare electric utility authorized ROEs to contemporaneous long-term utility debt rates. The differences between average authorized ROEs and average debt costs for each year are used to measure each year's equity risk premium. I first present this calculation for each year, 1980-2001, based on Moody's Utility

Bond interest rates, in my Schedule SCH-5, page 1. I also present a similar, albeit shorter-term, study based on S&P's Electric Utility interest rates, in my Schedule SCH-6. The S&P study covers only the period 1996-2001, because S&P only began publishing its Electric Utility Bond Index in 1996.

In the longer-term study (Schedule SCH-5), the data show that risk premiums are small when interest rates are high and larger when interest rates are low. For example, in the early 1980s when utility interest rates exceeded 15%, allowed equity risk premiums were generally less than 2%. In more recent years, with much lower interest rates, allowed regulatory risk premiums have generally been in the 3%-4% range.

The inverse relationship between risk premiums and interest rate levels is well documented in numerous, well-respected academic studies.[3] These studies typically use regression analysis or other statistical methods to predict or measure the risk premium relationship under varying interest rate conditions. In Schedule SCH-5, page 2, I present a regression analysis of the allowed annual equity risk premiums relative interest rate levels. The regression coefficient of –42.23% confirms the inverse relationship between risk premiums interest rates and indicates that risk premiums expand and contract by about 58% of the change in interest rates. This means that when interest rates rise by 1 percentage

[3] See, for example, Robert S. Harris and Felicia C. Marston, "Estimating Shareholder Risk Premia Using Analysts' Growth Forecasts," Financial Management, Summer 1992.

point, the cost of equity increases by only 0.58%, because the risk premium declines by about 0.42%. Similarly, when interest rates decline by 1 percentage point, the cost of equity declines by only 0.58%. I use the –42.23% interest rate change coefficient in conjunction with current interest rates to establish the appropriate current equity risk premium. This calculation is shown in the lower portion of my Schedule SCH-5, page 1.

In the shorter-term study shown in Exhibit SCH-6, interest rate differences from year-to-year are small, and, with only six years of electric only data, a regression analysis adjustment would not be statistically reliable. Therefore, the shorter-term, S&P electric only study in Exhibit SCH-6 should be viewed as confirmation of the longer-term, more statistically reliable study based on Moody's Utility Bond interest rates. Both studies provide the same 12% current estimate of ROE.

Q. How do the results of your risk premium studies compare to levels found in other published risk premium studies?

A. My risk premium studies indicate a lower risk premium than found in other published studies. For example, the most widely followed risk premium studies, which are published annually by Ibbotson Associates,[4] for the period 1926-2001, indicate an arithmetic mean risk premium of 6.6% for common stocks versus long-term corporate bonds. Under the

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[4] Ibbotson Associates, *Stocks, Bonds, Bills and Inflation 2002 Yearbook.*

assumption of geometric mean compounding, Ibbotson's risk premium for common stocks versus corporate bonds is 4.9%. Ibbotson argues extensively for the arithmetic mean approach as the appropriate basis for estimating the cost of equity. Even with the more conservative geometric mean risk premium, Ibbotson's data indicate a triple-B cost of equity of 13.1% (8.22% debt cost + 4.9% risk premium = 13.12%).

The Harris and Marston (H&M) study noted above also provides specific equity risk premium estimates. Using analysts' growth estimates to estimate equity returns, H&M found equity risk premiums of 6.47% relative to U.S. Government bonds and 5.13% relative to yields on corporate debt. H&M's equity risk premium relative to corporate debt indicates a current single-A cost of equity of 13.4% (8.22% debt cost + 5.13% risk premium = 13.35%).

VI. CONCLUSION

Q. Please summarize the results of your cost of equity analysis.

A. The following table summarizes my results:

Summary of Cost of Equity Estimates

DCF Analysis	Indicated Cost
Constant Growth Model	10.8%-11.1%
Multistage Growth Models	
Market Price Model	12.4%-12.6%
Two-Stage Growth Model	10.5%-10.6%
DCF Range	10.5%-12.6%
Risk Premium Analysis	
Utility Debt + Risk Premium	
Risk Premium Analysis (8.22% + 3.82%)	12.0%
Ibbotson Risk Premium Analysis	
Risk Premium (8.22% + 4.9%)	13.1%
Harris-Marston Risk Premium	
Risk Premium (8.22% + 5.13%)	13.4%
FG&E Fair Cost of Equity Capital	11.5%

Q. How should these results be interpreted to determine the fair cost of equity for FG&E?

A. Based on my review of the DCF results and my risk premium analysis, and my review of current market and electric utility industry conditions I believe that 11. 5% is a conservative estimate of FG&E's fair cost of equity capital.

Q. Does this conclude your testimony?

A. Yes, it does.